

SUPPORT FOR THE AMENDMENT

This Amendment amends Claim 1. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 is found in the specification at least at page 10, line 3 to page 11, line 8. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-13 will be pending in this application. Claim 1 is independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

The present invention provides a ceramic sheet having fewer surface defects than conventional ceramic sheets. The inventive ceramic sheet is formed by sintering a green sheet between spacers including spherical ceramic particles, which permit the green sheet to slide easily over the spacer during the sintering without acquiring localized surface flaws.

Claims 1, 3, 5-7 and 9-12 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,057,360 ("Osaka").

Osaka discloses a green sheet and a ceramic sheet produced by calcining the green sheet. Osaka discloses that green sheets include flaws such as fractures and cracks (Osaka at column 1, lines 25-27; Table 1, Control 1; Column 15, line 41). Osaka discloses that calcined ceramic sheets include warp (Osaka at column 13, line 68; Table 2).

The Final Rejection asserts:

This **fracture or crack** [of Osaka] is considered to be a defect that is a **foreign matter** present on a surface of the sheet or inside the sheet.

Applicant indicates a **warpage** is a macro-defect characterizing the twisting and deforming of a ceramic sheet in its entirety and the recited 'depression on the surface of the sheet' is a micro-defect characterizing only a localized portion of the surface of the ceramic sheet and not the entire ceramic sheet. In regards to Osaka this description is not accurate. Osaka discloses an amount of warp in the range of 0.007mm to 0.023mm (column 14, lines 5-15) where the **warp** is analogous to a **flaw**. This range of 0.007mm to 0.023mm is, in fact, present on a localized surface of the sheet and not the entire sheet. Final Rejection at page 7, line 14 to page 8, line 2 (emphasis added)

However, fractures and cracks are not foreign matter on a ceramic sheet, and Osaka fails to suggest warp present on a localized surface of the sheet and not the entire sheet.

The skilled artisan, as exemplified by Osaka, knows that fractures and cracks are not foreign matter. Osaka implicitly discloses that defects such as "warps, strains, and cracks" are a property of a ceramic sheet, and are not foreign matter on a ceramic sheet. For example, Osaka discloses:

For the purpose of precluding the **sintered sheet** from **developing** such **defects as warps, strains, and cracks** owing to the local difference and anisotropy of the shrinkage during the course of sintering and also improving the dimensional (sic) stability, the individual particles of the ceramic powder as the raw material are desired to be uniform in particle diameter and, what is more, to have a homoaxially (sic) spherical shape. Osaka at column 3, lines 43-51 (emphasis added).

Furthermore, Osaka does not disclose a warp restricted to a localized portion of a ceramic sheet. Instead, Osaka quantifies the amount of warp in a ceramic sheet by normalizing the amount of warp relative to a 50 mm square portion of the ceramic sheet.

Osaka discloses:

Then, the zirconia green sheets obtained in Examples 11 to 14 and 17 and Control 1 were calcined at 1,450°C. and the alumina green sheets obtained in Examples 15 and 16 were calcined at 1,650°C. to produce **ceramic sheets**. These sheets were evaluated with respect to density, surface roughness, maximum depth of curved surface (amount of *warp*) as reduced to the size of **50-mm square**. Osaka at column 13, line 66 to column 14, line 1 (emphasis added).

By normalizing warp over a 50-mm square portion of each ceramic sheet, Osaka implies that

*DRS* the warp is over the entire ceramic sheet. Thus, contrary to the Final Rejection assertion,

*Table makes normalization warp* Osaka fails to suggest warp present on a localized surface of a ceramic sheet and not the entire sheet.

Because Osaka's fractures and cracks are properties of Osaka's ceramic sheet, and are not foreign matter on Osaka's ceramic sheets, and because Osaka is silent about a warp that is restricted to a localized portion of an entire ceramic sheet, Osaka fails to suggest the independent Claim 1 limitation of a "defect ... being selected from the group consisting of foreign matter present on a surface of the sheet or inside the sheet, a flaw formed by a depression on the surface of the sheet, and a stain adhering to the surface of the sheet, wherein the foreign matter is a substance other than a starting material used for producing the ceramic sheet, and the flaw is a scratch formed during production of the ceramic sheet".

Thus, the rejection over Osaka should be withdrawn.

Claims 1-10 and 13 are rejected under 35 U.S.C. §103(a) over JP 8151270 ("Kazuo-270"). In addition, Claims 1-10 are rejected under 35 U.S.C. §103(a) over JP 8151271 ("Kazuo-271").

Kazuo-270 discloses a porous sheet is placed on a green sheet and fired to give a ceramic sheet having less than 0.1% warpage. Under loading tests cracking can occur. See Kazuo-270 at English-language Abstract.

Kazuo-271 discloses placing a green sheet on or between porous sheets and firing the green sheet to form a ceramic sheet having less than 0.1% warpage. See Kazuo-271 at English-language Abstract.

The Final Rejection asserts with respect to Kazuo-270:

... Kazuo discloses an average particle size of .1-0.5 $\mu\text{m}$  (abstract, line 6) along with a firing temperature placed on the green sheet and firing to give the ceramic sheet more than 400cm area, less than 0.4mm thickness and less than 0.1% **warpage** (abstract, lines 7-11). Kazuo discloses a ceramic sheet with 10% **cracks** or less (column 1, lines 1-19) which is considered to be a defect that is a of **foreign matter** present on a surface of the sheet or inside the sheet, which is present on a localized portion of the surface of the sheet and not the entire sheet. Final Rejection at page 8, lines 9-15 (emphasis added).

The Final Rejection asserts with respect to Kazuo-271:

... Kazuo discloses a ceramic sheet having an area of more than 600  $\text{cm}^2$  and thickness of 1mm or less (column 1, lines 1-4) having a maximum **warping** of 100 $\mu\text{m}$  or less and 0.1% or less **warpage** (column 1, lines 5-7) which is considered to be a defect that is a of **foreign matter** present on a surface of the sheet or inside the sheet, which is present on a localize portion of the surface of the sheet and not the entire sheet. Final Rejection at page, line 21 to page 9, line 4 (emphasis added).

As discussed above, the skilled artisan, as exemplified by Osaka, knows that warpage and cracks are properties of a ceramic sheet, and are not foreign matter on a ceramic sheet. *flaw defect spec*

Because Kazuo-270 and Kazuo-271 each fails to suggest the independent Claim 1 limitation of a "defect ... being selected from the group consisting of foreign matter present on a surface of the sheet or inside the sheet, a flaw formed by a depression on the surface of the sheet, and a stain adhering to the surface of the sheet, wherein the foreign matter is a substance other than a starting material used for producing the ceramic sheet, and the flaw is a scratch formed during production of the ceramic sheet", the rejections over each of Kazuo-270 and Kazuo-271 should be withdrawn.

Claims 1-13 are rejected under 35 U.S.C. §112, second paragraph, because assertedly:

a. In claims 1 and 5, the phrase '**baking the green sheet to be baked while the green sheet to be baked is sandwiched between the spacers**' is incoherent and indefinite. ...

b. In claim 8, the phrase '**the baking calcines the at least one of the spacers into a porous sheet**' is incoherent and indefinite. Final Rejection at page 2, section 3, lines 4-8 (emphasis added).

However, in response to a similar rejection in the Office Action dated August 6, 2002, Claims 1, 5 and 8 were amended in the Amendment filed December 6, 2002, so that Claims 1, 5 and 8 do not recite these phrases. Applicants respectfully submit that the pending claims meet the requirements of 35 U.S.C. §112, second paragraph. Thus, the rejection under 35 U.S.C. §112, second paragraph, should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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